A STUDY COMPARING MODIFIED ALVARADO SCORE AND TZANAKI'S SCORE FOR DIAGNOSING ACUTE APPENDICITIS

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CERTIFICATE

Certified that this dissertation is the bonafide work of Dr. **R.ARVIND RAJ** on **"A STUDY COMPARING MODIFIED ALVARADO SCORE AND TZANAKI'S SCORE FOR DIAGNOSING ACUTE APPENDICITIS"** during his M.S General Surgery course from May2016 to May 2019 at the Government Kilpauk Medical College and Government Royapettah Hospital, Chennai.

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The Institutional Ethical Committee of Govt. Kilpauk Medical College, Chennai reviewed and discussed the application for approval "***A STUDY COMPARING MODIFIED ALVARADO SCORE AND TZANAKI'S SCORE FOR DIAGNOSING ACUTE APPENDICITIS***" submitted by Dr.R.Aravind Raj, Post Graduate in M.S General Surgery, Govt. Kilpauk Medical College, Chennai-10.

The Proposal is **APPROVED.**

The Institutional Ethical Committee expects to be informed about the progress of the study any Adverse Drug Reaction Occurring in the Course of the study any change in the protocol and patient information /informed consent and asks to be provided a copy of the final report.

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DEAN
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INTRODUCTION

INTRODUCTION

Acute appendicitis is one of the most common cause of Abdominal surgical emergencies with lifetime prevalence of approximately 1 in 7 worldwide. It is associated with high morbidity and occasional mortality related to failure of making an early diagnosis.

Acute appendicitis is still a clinical diagnosis. Abdominal pain being the most common symptom. In the classic presentation, the patient describes the pain as beginning in the periumbilical or epigastric region and then migrating to right iliac fossa. This is associated with fever, anorexia, nausea, and vomiting.

The clinical presentation of acute appendicitis varies widely owing to variable degree of involvement by inflammatory process, different positions of appendix and varying age of the patient. The inconsistent clinical presentation often leads to misdiagnoses of acute appendicitis in 1 out of 5 cases and negative appendicectomy rates in the range of 15 – 40%. Adding to this the “classic” symptomatology only occurs in 50-60% of cases making the diagnosis difficult.

Difficulties in diagnosis especially arise in very young, elderly patients and females of reproductive age because they are more likely to have an atypical presentation, and many other conditions may mimic acute appendicitis in these patients.

Many surgeons advocate early surgical intervention for the treatment of acute appendicitis to avoid perforation, accepting a negative appendectomy rate of about 15-20%.

Removing normal appendix is an economic burden on both patients and health resources. Misdiagnosis and delay in surgery can lead to complications like perforation and finally peritonitis.

Many scoring systems for the diagnosis of acute appendicitis have been tried. The Modified Alvarado Score is a easy, simple and cheap diagnostic tool for supporting the diagnosis of acute appendicitis. Tzanakis score is another scoring is a combination of clinical evaluation, inflammatory markers and ultrasound. Our study compares the efficacy of Modified Alvarado Score and Tzanakis Score in diagnosing acute appendicitis.

AIM OF THE PRESENT STUDY

To compare the efficacy of Modified Alvarado Score and Tzanakis Score in Diagnosing Acute Appendicitis.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

The first known appendicectomy was performed in 1736 by Claudius Amyand in London. He operated on an 11-year-old boy with a scrotal hernia and a fecal fistula. Within the hernia sac, Amyand found a perforated appendix surrounded by omentum. The appendix and omentum were amputated.

In 1886 Reginald Fitz from Boston first identified inflammation of the appendix as a cause of right lower quadrant pain. He coined the term ‘appendicitis’ and recommended early surgery intervention. Appendicectomy remains one of the most commonly performed operations worldwide. Acute appendicitis is the most common indication for appendicectomy.

ANATOMY

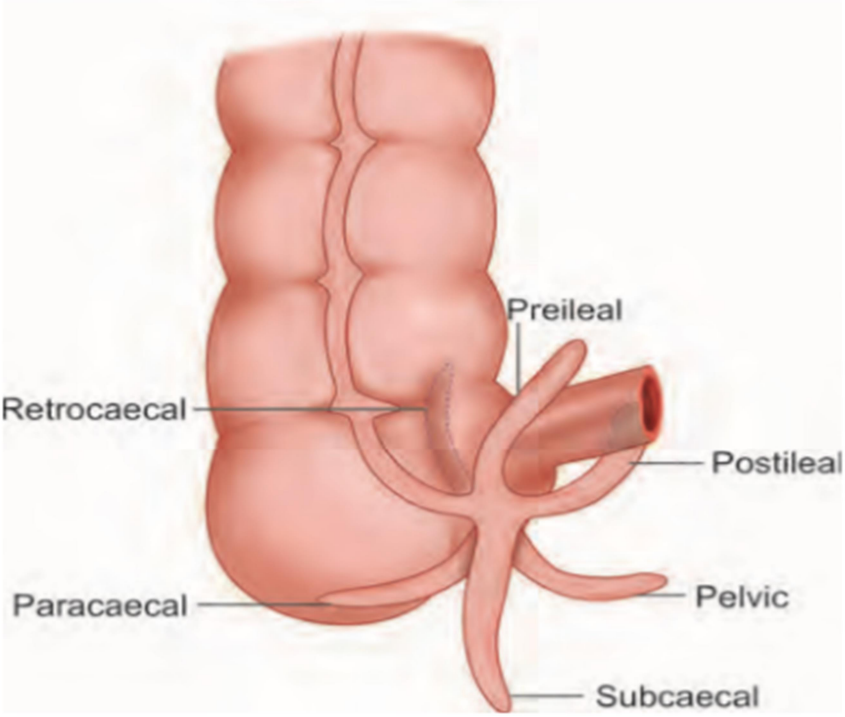
The appendix is located at the base of the cecum where the teniae coli coalesce. Although this location is constant, the position of the appendix is variable. The appendix is located about 2.5 cm inferior to the ileocecal valve and is attached to the terminal ileum by the ligament of Treves, while the mesoappendix extending from the mesentery contains its vascular supply. The appendix is usually about 6 to 12 cm long, but may

reach over 16 cm in length. Diameter of appendix is 3-8mm. Diameter of lumen is 1-3mm.

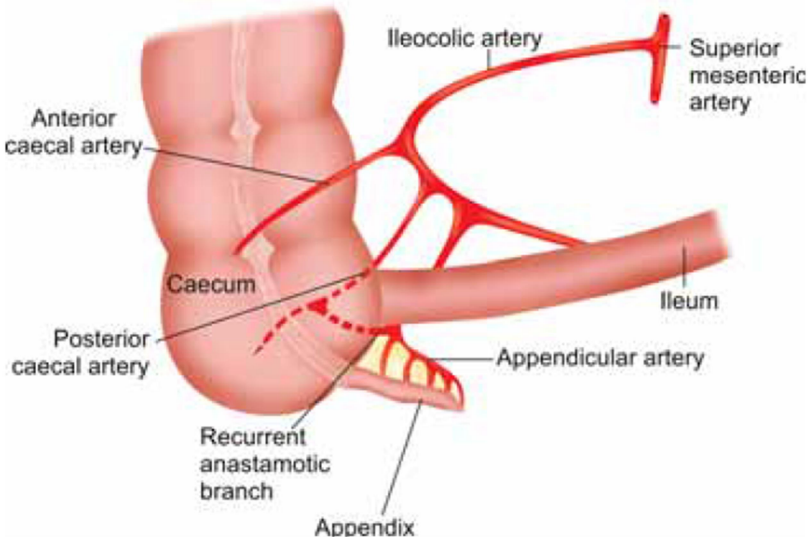
Mesoappendix is extension of the mesentery contains appendicular artery, a branch of ileocolic artery. Often an accessory appendicular artery (of Seshachalam) may be present. Thrombosis of these vessels leads to gangrenous appendicitis. Opening of the appendix into caecum is guarded by ‘valve of Geralch’.

The appendiceal position is variable with the most common being intraperitoneal extending retrocaecally(75%) toward the pelvic brim and iliac fossa. Other positions are pelvis(30%), paracolic, preileal, postileal etc.

To further complicate matters, malrotation and nonrotation of the intestine can place the appendix in the mid-abdomen or left upper quadrant. In addition, although rare (about 4 per 100,000 persons), appendiceal duplications do occur. These variable positions can lead to atypical presentations of appendiceal disease and, hence the surgical dictum, “appendicitis should always be in the top three differential diagnoses of acute abdominal pain in any location”.



Various positions of appendix



Vascular supply of Appendix

The lymphatic drainage of the appendix flows into lymph nodes that lie along the ileocolic artery. Innervation of the appendix is derived from sympathetic elements contributed by the superior mesenteric plexus (T10-L1) and afferents from the parasympathetic elements via the vagus nerves.

The histologic features of the appendix are contained within the three following layers: the outer serosa, which is an extension of the peritoneum; the muscularis layer, which is not well defined and may be absent in certain locations; and finally, the submucosa and mucosa. Lymphoid aggregates occur in the submucosal layer and may extend into the muscularis mucosa. Lymphatic channels are prominent in regions underlying these lymphoid aggregates. The mucosa is like that of the large intestine, except for the density of the lymphoid follicles. The crypts are irregularly sized and shaped, in contrast to the more uniform appearance of the crypts in the colon. Neuroendocrine complexes composed of ganglion cells, Schwann cells, neural fibers, and neurosecretory cells are positioned just below the crypts.

FUNCTIONS OF APPENDIX

For many years, the appendix was erroneously believed to be a vestigial organ with no known function. It is now well recognized that the appendix is an immunologic organ that actively participates in the secretion of immunoglobulin, particularly immunoglobulin A.

Though appendix is not indicated in the development of human disease, an inverse association between appendectomy and the development of ulcerative colitis has been reported, suggesting a protecting beneficial effect of the appendectomy especially in developed countries. However, this association is only seen in patients treated with appendectomy for appendicitis before age 20.

The association between Crohn's disease and appendicectomy is less clear. Although earlier studies suggested that appendectomy increases the risk of developing Crohn's disease, more recent studies that carefully assessed the timing of appendicectomy in relationship to the onset of Crohn's disease demonstrated no correlation. A recent meta-analysis demonstrated a significant risk of Crohn's disease early following appendicitis. This risk diminishes later, which suggests that a diagnostic (misidentifying Crohn's disease as appendicitis) rather than a physiologic relationship exists between appendectomy and Crohn's disease.

The appendix may function as a reservoir to recolonize the colon with healthy bacteria. One retrospective study demonstrated that prior appendectomy may have an inverse relationship to recurrent Clostridium difficile infections. However, in another retrospective study, prior appendectomy did not affect the rate of C. difficile infections. The role of the appendix in recolonizing the colon remains to be elucidated.

ACUTE APPENDICITIS

PATHOPHYSIOLOGY

Acute appendicitis is the most common of the appendiceal diseases. Its peak incidence occurs in the second and third decades of life, with a lower rate in children <4 years old and a progressively reducing incidence in adults over 30 years old. However, the risk of mortality occurs at the extremes of age.

Acute appendicitis occurs as a result of obstruction of the appendiceal lumen. In young patients who have an abundance of lymphoid tissue, lymphoid hyperplasia can be the cause of the obstruction. In older patients, fecoliths may be the cause.

TYPES

1. *Acute nonobstructive appendicitis (catarrhal) (mucosal appendicitis):*

Inflammation of mucous membrane occurs with redness, oedema and haemorrhages which may go for following courses:

- ™ Resolution ™
- Ulceration ™
- Fibrosis ™

- Suppuration ™
- Recurrent appendicitis ™
- Gangrene—rare initially in nonobstructive type but later can occur ™
- Peritonitis.

2. *Acute obstructive appendicitis:*

Here pus collects in the blocked lumen of appendix which is blackish, gangrenous, oedematous and rapidly progresses leading to perforation either at the tip or at the base of appendix. This leads to peritonitis, formation of appendicular abscess or pelvic abscess. Most often, there will be thrombosis of the appendicular artery.

3. *Recurrent appendicitis:*

Repeated attacks of nonobstructive appendicitis leads to fibrosis, adhesions causing recurrent appendicitis.

4. *Subacute appendicitis* is milder form of acute appendicitis.

OBSTRUCTION OF APPENDECEAL LUMEN

↓

ACCUMULATION OF MUCUS

↓

INCREASED INTRALUMINAL PRESSURE

↓

OCCLUSION OF BLOOD VESSELS IN APPENDICEAL WALL

↓

NECROSIS

↓

BREAKDOWN OF APPENDICEAL MUCOSAL BARRIER

↓

INFECTION AND INFLAMMATION

↓

PERFORATION

↓

MASS FORMATION

Inflamed appendix

Intraoperative picture showing inflamed appendix

MICROBIOLOGY

The microbial flora of the inflamed appendix differs from that of the normal appendix. About 60% of aspirates from inflamed appendices have anaerobes compared to 25% of aspirates from normal appendices.

Tissue specimens from the inflamed appendix wall usually grow *Escherichia coli* and *Bacteroides* species on culture. *Fusobacterium nucleatum/necrophorum*, which is not present in the normal cecal flora, has been identified in 62% of inflamed appendices. In addition to the other usual species (Peptostreptococcus, Pseudomonas, Bacteroides splanchnicus, Bacteroides intermedius, Lactobacillus) fastidious gram-negative anaerobic bacilli have been encountered. Patients with gangrene or perforated appendicitis appear to have more tissue invasion by Bacteroides.

CLINICAL PRESENTATION

The classic presentation is

- Migratory RIF pain starting in the periumblical region which over the course of few hours localized to the right lower quadrant at McBurney's point. It is due to progression of midgut visceral pain due to distention of the appendix "hollow

viscus" to somatic parietal pain as the peritoneum covering the appendix becomes inflamed. . Pain eventually becomes severe and diffuse which signifies spread of infection into the general peritoneal cavity.

- Nausea & vomiting – due to reflux pylorospasm
- Fever

Other symtoms that may be associated with appendicitis are

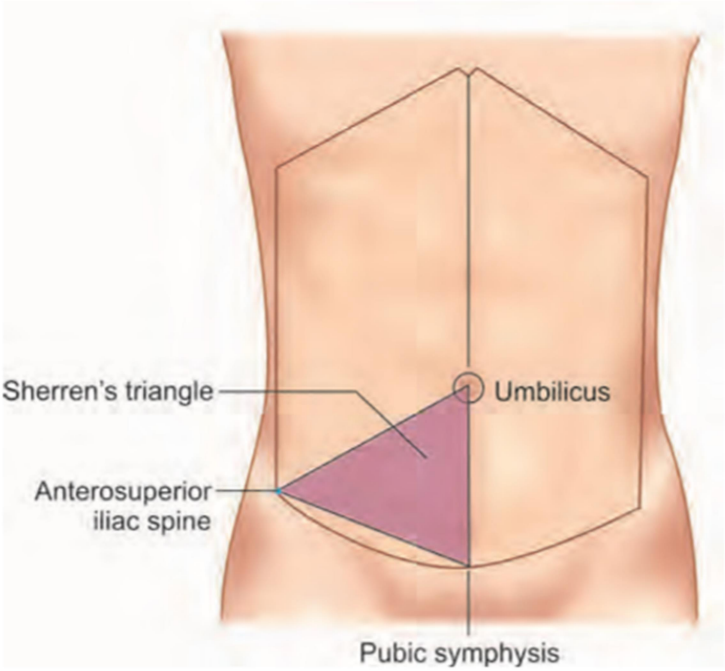
- Anorexia,
- Constipation is the usual feature but diarrhoea can occur if appendix is in postileal or pelvic positions
- Urinary frequency: Inflamed appendix may come in contact with bladder and can cause bladder irritation.

The classical signs are described as ***MURPHY'S TRIAD***

- *Pain—first*
- *Vomiting—next*
- *Temperature—last*

Classically, physical examination demonstrates

- right lower quadrant pain with localizing signs of peritonitis – guarding and rebound tenderness.



Sherren's triangle- It is area of hyperaesthesia found in acute appendicitis between anterosuperior iliac spine; umbilicus and pubic symphysis.

Other signs are

- *Rovsing sign* -right lower quadrant pain with palpation of the left lower quadrant

- *Blumberg sign* – pain felt upon sudden release of steadily applied pressure on the abdomen. Also called as rebound tenderness

- *Bassler's sign* – Sharp pain created by compressing appendix between abdominal wall and iliacus. Seen in chronic appendicitis

- *Dunphy sign* (right lower quadrant pain with coughing),

- *psoas sign* (pain on extension of the righthip), and the

- *obturator sign* (pain with internal rotation of the right hip).

- *Baldwing's test* is positive in retrocaecal appendix—when legs are lifted off the bed with knee extended, the patient complains of pain while pressing over the flanks.

- *Aarons sign* – Done in males. There is retraction of testis whenever right iliac fossa is palpated. This shows that appendix is not perforated.

- *Pointing Sign* – Patient points to site of pain. Starts from periumblical region and moves to lower right quadrant

Acute appendicitis in infancy:

Even though it is rare, when it occurs, it has got 80% chances of perforation with high mortality (50%).

Acute appendicitis in children:

Here localization is not present, and so peritonitis occurs early. It requires early surgery. Dehydration, septicemia is common.

In elderly:

Gangrene and perforation are common. Because of lax abdominal wall, localisation is poor and so peritonitis sets in early.

In pregnancy:

Incidence is 1 in 2,000 pregnancies. It is more common in 1st and 2nd trimesters. Appendix shifts to upper abdomen. So pain is higher and more lateral.

LABORATORY AND IMAGING DIAGNOSIS

Laboratory testing and imaging may help to secure the diagnosis of appendicitis.

- Although leukocytosis is helpful, up to one third of patients may have a normal white blood cell count
- A "left shift" with increased proportion of polymorphonuclear neutrophils and immature cells are typical, but, once again, not always present
- C-reactive protein is generally elevated.

However, none of these findings carries sufficient sensitivity and specificity to secure a diagnosis.

Although traditionally acute appendicitis was a clinical diagnosis, advances in imaging have improved diagnostic accuracy, leading to a lower rate of negative appendectomy without an increase in perforated appendicitis.

Plain abdominal radiographs can be useful if a fecolith or some other intra-abdominal pathology is found (such as free air), but, in general, these films do not aid in diagnosis.

Ultrasonography, in skilled hands, can identify an enlarged appendix in patients who present with equivocal findings or women where pelvic pathology may be a concern. However, the overall positive and negative predictive values are in the 80% to 100% range. Although ultrasonography is not as accurate as CT scanning, it may be the imaging test of choice in patients for whom limiting radiation exposure is desirable, such as pregnant women and children.

CT scanning has become the mainstay of imaging. This can be done with “reduced radiation” protocols. Typically, these scans use IV, oral and rectal contrast, although there is evidence that these agents may not be required. The signs of acute appendicitis included an enlarged appendix of >6 mm in diameter, thickened appendiceal wall of >2 mm (referred to as the “target” sign), periappendiceal inflammation (fat stranding), presence of a fecalith, and a thickened cecum funneling contrast to the appendix (“arrowhead” sign). With this, diagnosis accuracy can exceed 95%.

DIFFERENTIAL DIAGNOSIS OF APPENDICITIS

- *Perforated duodenal ulcer*:

  In duodenal ulcer perforation, fluid trickles down along right paracolic gutter and mimics appendicitis. Upper abdominal pain, obliterated liver dullness, gas under diaphragm in X-ray and CT scan differentiate it from acute appendicitis.

- *Acute cholecystitis*:

  Pain in right upper abdomen, fever, jaundice, upper abdominal guarding are the features of acute cholecystitis. USG will differentiate it from acute appendicitis.

- *Acute pancreatitis*:

  Pain in epigastrium, radiating to back, raised serum amylase and lipase, CT abdomen with a history of alcohol intake often are diagnostic.

- *Right ureteric colic*:

  Pain is colicky in nature which often refers to genitalia. Haematuria, urinary symptoms are common. It mimics retrocaecal/pelvic acute appendicitis. Often in ureteric stone, abdomen is soft and nontender. CT is the important way to differentiate.

- *Acute typhlitis*:

  Inflammation of caecum is called as typhlitis. Often it is difficult to differentiate it from acute appendicitis. Intravenous/ oral metronidazole completely controls the disease.

- *Acute bacterial enterocolitis*:

  It presents with pain abdomen, diarrhoea, toxaemia, dehydration. Often it is difficult to differentiate from acute appendicitis.

- *Acute mesenteric lymphadenitis:*

  It is difficult to differentiate from acute appendicitis. It is treated conservatively. CT may be helpful to identify it. Laparoscopic evaluation is ideal.

- *Right sided acute pyelonephritis*:

  Here there will be pain and tenderness in loin. Urine analysis, USG are diagnostic. Often DTPA scan may be needed

- *Pelvic inflammatory disease* like salpingo-oophoritis mimics acute appendicitis.

- *Twisted/haemorrhagic/ruptured ovarian cyst/ruptured ectopic gestation/endometriosis/tubo-ovarian abscess mimics* acute appendicitis. USG, laparoscopy helps to differentiate it from others. Mittelschmerz is lower abdominal pain due to rupture of follicular cyst during midcycle. It subsides on its own. There are no systemic features.

- *Meckel's diverticulitis* presents clinically like acute appendicitis. It is not possible to differentiate between two clinically.

- *Intussusception* mimics acute appendicitis in children. Intussusesception is common before the age of 2 years. Acute appendicitis is rare before the age of 2 years. Palpable mass, features of intestinal obstruction, barium enema X-ray, US are useful methods to differentiate.

- *Worm infestation* (round worm bolus/ball): It often presents as pain in right iliac fossa. Features of intestinal obstruction are common here.

APPENDICULAR MASS

It is the localisation of infection occurring 3 to 5 days after an attack of acute appendicitis.

Inflamed appendix, greater omentum, oedematous caecum, parietal peritoneum and dilated ileum forms a mass in the right iliac fossa. This mass is tender, smooth, firm, well localised, not moving with respiration, not mobile, all borders well made out and resonant on percussion. Patient may have fever and features of toxicity.

Differential diagnosis for appendicular mass

- Carcinoma caecum
- Ruptured ectopic pregnancy
- Ovarian cyst
- Ileocaecal tuberculosis

Treatment

Conservative (Ochsner-Sherren Regimen), as nature has already localised the infection, if now disturbed will lead to faecal fistula.

Ochsner-Sherren Regimen Includes

- Observation:
- Temp, BP, pulse chart.
- Marking the mass to identify the progression/regression.
- Antibiotics (depending on severity and requirement).
- IV fluids.
- Analgesics.
- Initial nasogastric aspiration.

Patient usually shows response by 48 to 72 hours and mass reduces in size, temperature and pulse becomes normal. Appetite is regained. 90% of patients respond to conservative therapy. Patient is discharged and advised to come for interval appendicectomy after 6 weeks.

Criteria to discontinue Ochsner-Sherren regimen

- Patient becomes more toxic-tachycardia, high fever
- Persistent vomiting
- Increase or spread of pain abdomen
- Increased size of the mass
- Suppuration (abscess formation) in the mass

In these patients the regimen is discontinued. The patient is taken for immediate surgery.

APPENDICULAR ABSCESS

- It occurs due to suppuration in an acute appendicitis or suppuration in an already formed appendicular mass.
- Abscess commonly occurs in retrocaecal region but often can occur in subcaecal, preileal lumbar or postileal regions.
- The patient has high fever, features of toxicity, tender, smooth, soft swelling in right iliac fossa which lies towards right lateral and lower side with clear upper margin but indistinct lower margin.

Treatment

- Antibiotics are started.
- CT-guided aspiration or catheter drainage is done often as initial therapy.
- If patient's condition worsens or Guided drainage fails ,Under anaesthesia, incision is made in the lower lateral aspect of the swelling above the inguinal ligament. Skin, external oblique muscle is cut. Abscess cavity is opened and

pus is drained extraperitoneally. Wound is closed. A drain is placed through a separate incision. Antibiotics are continued.

- Interval appendicectomy is done after 3 months.
- Pelvic abscess may also be drained per-rectally or through posterior colpotomy in females.

NON OPERATIVE MANAGEMENT OF ACUTE APPENDICITIS

Traditionally, appendicitis has been a surgical disease. Over the last decade, there has been an increased interest in primary nonoperative antibiotic treatment of "uncomplicated" appendicitis. These studies have used a variety of means to diagnose appendicitis preoperatively, a variety of antibiotic regimens, and both open and laparoscopic approaches,

However, what can be said is that appendectomy has a "cure" rate for appendicitis approaching 99%, with almost no recurrences of appendicitis, but a measurable surgical complication rate, mostly infectious in nature. Antibiotic therapy has a "cure" rate of

70% to 90%, but with a recurrent appendicitis rate 15% to 30%, yet a small number of serious adverse events.

Therefore, primary nonoperative antibiotic therapy may be appropriate in selected individuals with uncomplicated appendicitis, and these patients still require follow-up to assess for recurrence.

Appendiceal phlegmons/mass can be managed nonoperatively with antibiotic therapy, with or without “interval” appendectomy or by immediate appendicectomy. A meta-analysis of nonoperative management reported an overall “failure rate” of antibiotics of about 7%. However, the risk of recurrent appendicitis has been reported to be 7% to 40%. In addition, neoplasia or “important” benign disease has been found in up to 7% of patients presenting with appendiceal inflammatory masses.

On the other hand, immediate appendectomy is certainly very challenging in these patients. Surgical complications can occur in up to 20% of patients, with need for cecectomy or ileocolectomy in up to 30.

Therefore, an initially nonoperative approach, with subsequent interval appendectomy is the best stratergy, although it cannot be definitively stated that interval appendectomy is mandatory.

Study	Sample Size	Antibiotic Regimen	Conclusion
Styrud et al., 2006	252	IV cefotaxime/tinidazole p.o. ofloxacin/tinidazole	Acute nonperforated appendicitis can be treated successfully with antibiotics
Farahnak et al., 2007	42	IV gentamicin/metronidazole p.o. amoxicillin/clavulanic acid	
Malik & Bari, 2009	80	IV ciprofloxacin/metronidazole	Antibiotics effective in the acute appendicitis
Hansson et al., 2009	369	IV cefotaxime/metronidazole p.o. ciprofloxacin/metronidazole	Antibiotic treatment safe first-line therapy for acute appendicitis
Vons et al., 2011	239	IV amoxicillin/clavulanic acid	Antibiotic therapy only not noninferior
Salminen et al., 2015	530	IV ertapenem p.o levofloxacin/metronidazole	Antibiotic treatment did not meet criteria for noninferiority
Cochrane Review. Wilms et al., 2001	5 RCTs 901 patients	Various	"Cure" defined as no major complications in 2 wks and no recurrences in 1 yr Antibiotics: 73.4% cured Appendectomy: 97.4% cured

OPERATIVE MANAGEMENT

Appendicectomy is still considered to be the treatment of choice for acute appendicitis. Usually it is done through a small incision in Right iliac fossa called as Mcburney's incision or one of its variants such as Lanz incision, Rutherford Morrison's , Rockey davis incision etc. Lower midline laparotomy incision is used in some cases of perforated appendicitis and appendicular abscess.

With the rise of laparoscopy in past decade, laparoscopic appendicectomy has become the predominate approach to appendicectomy in many centres for uncomplicated appendicitis.

APPENDICECTOMY

TYPES OF APPENDICECTOMY

• **Open appendicectomy**:

Appendicectomy can be done through a small incision in right iliac fossa. Emergency appendicectomy is most often done by open method. Here entire peritoneal cavity cannot be visualized. Often it may require extension of incision or converting into formal laparotomy.

• **Laparoscopic appendicectomy**:

It is the gold standard approach for elective appendicectomy. Incision is small. Entire peritoneal cavity can be seen which is important especially in females. Multiple trials have been carried out all over the world comparing open and laproscopic approaches for appendicectomy.

Advantages

- Diagnosis is confirmed.
- Other parts of the abdomen are visualized.
- In females pelvic structures are assessed properly.
- Trauma of access is less.
- Faster recovery.
- Laparoscopic appendicectomy is definitely better whenever there is vague abdominal pain; atypical pain; situs inversus; in women; subhepatic appendix and as interval appendicectomy.

Disadvantages

- Technical difficulties especially in burst appendix.
- Cost factor and availability.

• **Laparoscopic assisted appendicectomy:**

Peritoneal cavity is visualised through laparoscope and appendix is delivered outside under vision through umbilical port or 10 mm working port. Mesoappendix and stump is dealt like in open appendicectomy. It is faster and meantime diagnosis is also confirmed. But it is often difficult to bring out the appendix with mesoappendix outside as mesoappendix may get torn

.

• S**ingle incision laparoscopic surgery (SILS)**.

Appendicectomy is done through a single port inserted in the umbilicus. This technique though has minimal scarring, has a higher learing curve and is technically demanding.

Inflammed appendix with gangrenous changes at base

OPEN APPENDICECTOMY

ANAESTHESIA:

It is usually done under spinal anaesthesia. However for small children, general anaesthesia is preffered.

INCISION:

• *McBurney's incision* (Gridiron):

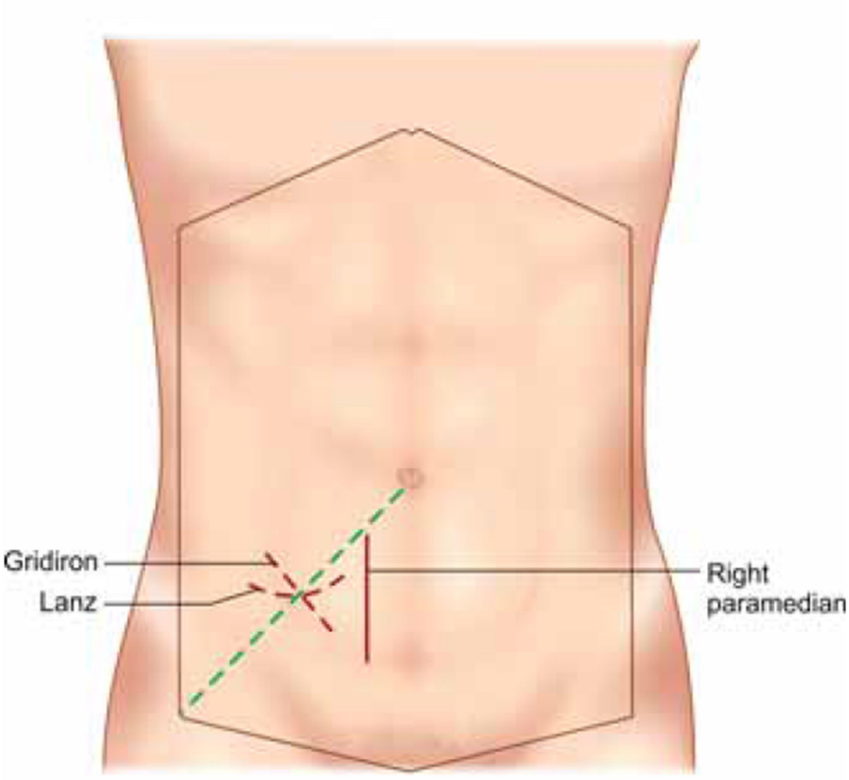
McBurney's point is junction of lateral 1/3rd and medial 2/3rd of right spinoumbilical line. At this point perpendicular to this line, incision of 5 cm in length is made 2.5 cm on each side. It is muscle splitting incision.

• *Lanz crease incision:*

It is curved horizontal incision of 5 cm in length. Deeper dissection is same as McBurney's incision. It is cosmetically better as it is in the crease line.

• *Rutherford Morrison's muscle cutting incision:*

It is usually modification done in an originally placed McBurney's incision as an extension to have better approach. Here internal oblique and transverse abdominis muscle are cut laterally. It is often done in higher or difficult or subhepatic appendix.



• *Fowler-Weir (Fowler-Davis; Rockey-davis) approac*h:

Here extension of the original McBurney's incision is done medially and below by cutting lateral part of the rectus sheath. It is used in pelvic appendix or to feel the right ovary properly

.

• *Right paramedian or lower midline incision:*

It is used in case of peritonitis due to ruptured appendicitis

PROCEDURE:

- Under general, skin is incised. Two layers of superficial fascia are cut. External oblique aponeurosis is opened in the line of incision.
- Internal oblique and transverse muscles are split in the line of fibres. Peritoneum is opened in the line of incision.
- Caecum is identified by taeniae, and ileocaecal junction. Omentum when adherent is separated. Appendix is held with Babcock's forceps.
- Mesoappendix with appendicular artery is ligated. Using thread or silk, a purse—string suture is placed around the base of the appendix. Base of the appendix is crushed with artery forceps and transfixed using vicryl.
- Appendix is cut distal to the suture ligature and removed. Stump is cleaned with antiseptics. Purse string suture is tightened so as to bury the stump.
- Abdomen is closed in layers after securing hemostasis and placing drain if needed.

COMPLICATIONS OF APPENDICECTOMY

Mortality rate of appendicectomy is less than 1%. Morbidity and complications are more after surgery for perforated appendicitis.

- *Paralytic ileus* is due to sepsis and bowel handling. It usually subsides in 2-3 days.

- *Reactionary haemorrhage* though uncommon due to slipping of ligature of the appendicular artery can be life threatening. Tachycardia, pallor, dropping haemoglobin and PCV are the indicators. Emergency reexploration with transfusion of blood is needed. Clots are removed. Bleeding artery needs to be identified and ligated securely.

- *Residual abscess* (pelvic, paracolic, local, subdiaphragmatic) can occur. Its severity depends on the virulence and load of the bacteria. It is initially treated with antibiotics. If it persists or progresses, CT scan is done to confirm it and later appropriately drainage is done depending on the location of the abscess.

- *Adhesions, kinking* and intestinal obstruction can cause recurrent spasmodic/colicky pain with vomiting. It is initially treated conservatively; but may require laparoscopic adhesiolysis later.

- *Right inguinal hernia (direct)*—due to injury to ilioinguinal nerve can occur.

- *Wound sepsis - Surgical site infection* is 5% in uncomplicated appendicitis; 20% in

perforated appendix after surgery.. Wound is laid open and later secondary suturing is done in case of wound sepsis.

- *Faecal fistula*- It can occur when appendicectomy is done in gangrenous/ perforated/ friable base appendix. It can occur after drainage of appendicular abscess. It can occur if appendicectomy is done or attempted in appendicular mass. Initial treatment is conservative. It usually subsides in few weeks . Most of the time fistula subsides, provided there is no distal obstruction by adhesions or kinking or specific causes like carcinoma or tuberculosis. If persists even after 6 weeks, resection of ileocaecal segment and anastomosis is done.

- *Stump appendicitis* is inflammation and infection in the remaining portion of the appendix in the stump after appendicectomy. It is a rare entity

SCORING SYSTEMS IN ACUTE APPENDICITIS

Despite the wide availability of diagnostic methods, clinical dilemma persists. Various scoring systems have been devised to improve the diagnostic accuracy of acute appendicitis.

The first scoring system was published by 'Van Way' in 1982. It is currently not in use

Next Alvarado in 1986 described his score based on 8 signs, symptoms and laboratory values,

ALVARDO SCORE

Symptom/sign	Points
Migration of pain	1
Anorexia	1
Nausea/vomiting	1
Right iliac fossa tenderness	2
Fever	1
Positive Blumberg sign	1
Leukocytosis >10,000	2
Left shift in WBC differential	1

1-4: low probability of AA; 5-6: average probability, observation recommended; 7-10: high probability of AA

It was later by Kalam in 1994 where shift to left has been removed modified and named as Modified Alvarado score(MAS)

MODIFIED ALVARADO SCORE

Symptoms	
Migratory right iliac fossa pain	1
Nausea/Vomiting	1
Anorexia	1
Signs	
Tenderness in right iliac fossa	2
Rebound tenderness in right iliac fossa	1
Elevated temperature	1
Laboratory findings	
Leukocytosis	2
Total	9

Score of 5 or more signifies appendicitis

In their prospective study, Kariman et al evaluated Alvardo Score(A.S) in 300 patients who were admitted with abdominal pain and randomized them into two groups depending on their score with the cut-off value of 7. They found that AS can be used in patients with abdominal pain reliably and a score of more than 7 indicates AA possibility at the rate of 93% and a negative test (i.e., AS of ≤7) indicates unlikeliness of AA at the rate of 26%. As a result, they stated that AS is a reliable test for the diagnosis of appendicitis but insufficient to exclude the diagnosis.

Chan et al. (14) found that the incidences of AA in patients with an AS of 9–10, 7–8, and ≤6 were 100%, 68%, and 5%, respectively.

The score proposed by Izbicki in 1990, is based on 7 items (gender, leucocytes, guarding, rebound pain, migration of pain, duration of pain and type of pain)

IZBICKI SCORING SYSTEM FOR APPENDICITIS

Gender	Male	1	Female	0
White cell count	>11000	1	<11000	0
Rebound Pain	Present	1	Absent	0
Migration of pain to Right lower quadrant	Present	1	Absent	0
Duration of pain	<24hrs	1	>24hrs	0
Type of pain	Intermittent	1	Other	0
Scores <=2: Monitoring >2 : Surgery				

In 1992, Christian published a simpler score, based on 5 items with 1 or 0 points (abdominal pain, vomiting, tenderness, low grade fever and polymorphonuclear leucocytosis)

CHRISTIAN SCORING FOR APPENDICITIS

Abdomen pain	<48hrs	1	Other	0
Vomiting	Yes	1	No	0
Tenderness	Right lower quadrant	1	Other	0
Low grade fever	<38.8	1	>38	0
White cell count	>11000	1	<11000	0
Scores	<=3:Monitoring		>3: Surgery	

In 1996, Fenyo published a scoring system

Symptom/sign, variable	Points
All patients start with	-10
Sex:	
female	-15
male	+8
WBC count	
<8900	-15
9000-13900	+2
<14000	+10
Duration of complaint:	
<24 h	+3
24-48 h	0
>48 h	-12
Progression of pain	
yes	+3
no	-4
Migration of pain	
yes	+7
no	-9
Vomiting	
yes	+7
no	-5
Aggravation with cough	
yes	+4
no	-11
Positive Blumberg sign	
yes	+5
no	-10
Rigidity	
yes	+15
no	-4

-2 or more: AA, -17 or less: non-specific pain

RIPASA(Raja Isteri Pengiran Anak Saleha Appendicitis) scoring system has been developed in 2010 specifically for middle eastern and Asian population.

Male	0,5
Female	1
Age <39.9 years	1
Age >40 years	0,5
Right iliac fossa pain	0,5
Migration of pain	0,5
Anorexia	1
Nausea/vomiting	1
Complaint duration <48 h	1
Duration of complaint >48 h	0,5
Right iliac fossa tenderness	1
Obrona mięśniowa / muscular guarding	2
Positive Blumberg sign	1
Positive Rovsing sign	2.0
Fever >37°C, <39°C	1
Leukocytosis	1
Negative urinalysis	1
Foreigner	1

<5: AA very unlikely; 5-7.0: AA unlikely; 7.5-11.0: AA very likely; >12: definitely AA

This scoring system had a sensitivity of only 96% and a specificity of 73% for a cut-off threshold set at >4 or a sensitivity of 37% and specificity of 99% if the cut-off threshold was set at >8.

Appendicitis inflammatory response score' was introduced by Andersson et al in 2008

Appendicitis Inflammatory Response Score

Vomiting		1
Pain in right inferior fossa		1
Rebound tenderness or muscular defense	Light	1
	Medium	2
	Strong	3
Body temperature > 38.5°C (101.3°F)		1
Polymorphonuclear leukocytes	70%-84%	1
	≥ 85%	2
WBC count	10.0-14.9	1
	≥ 15.0	2
CRP concentration	1-4.9 mg/L	1
	≥ 5 mg/L	2
Sum		**(0-12)**

Sum 0–4 = Low probability. Outpatient follow-up
Sum 5–8 = Indeterminate group. Inhospital active observation
Sum 9-12 = High probability. Surgical exploration is proposed

This is one of newly introduced that has been adopted widely at many centres

In 2005 Tzanakis et al developed a scoring system introduces a quantitative combination of the clinical evaluation with US imaging and a marker of inflammatory response.

Symptom/sign, variable	Points
Signs of appendicitis in ultrasound examination	6
Right iliac fossa pain	4
Positive Blumberg sign	3
WBC count >12,000	2

AA≥8 points

TZANAKIS SCORE

Out of all the scoring systems discussed here, only Tzanakis Score include a imaging modality – Ultrasound scan, which in the current era is available in almost all the centres. The current study aims to compare Alvarado and Tzanakis scores for the diagnosis of acute appendicitis.

MATERIALS AND METHODS:

MATERIALS AND METHODS

100 patients between the age of 12 to 75 who presented to the General Surgery department of Govt. Royapettah Hospital with clinical diagnosis of acute appendicitis and underwent emergency open appendicectomy were included in the study

INCLUSION CRITERIA:

- Patients aged more than 12 of both genders
- Patients with suspected acute appendicitis based on history and clinical examination

EXCLUSION CRITERIA:

- Patients with age less than 12 and more than 75.
- Patient with alternate diagnosis during surgery with or without inflamed appendix
- Those with appendicular abscess, appendicular mass, generalized peritonitis

SAMPLE SIZE

100

		Disease +	Disease -	
Test	+	*a*	*b*	
	-	*c*	*d*	
		(a+c)	*(b+d)*	*N*

a – true positive

b- false positive

c- false Negative

d- true negative

These values were taken from parent article for determining the sample size

Sample size is calculated using the formula

$$n = Z^2(P * Q)/C^2$$

n will be (a +c) if we use Sensitivity as P and n will be (b + d) if we use Specificity as P in the the formula

Z- with 95% confidence interval z value is taken as 1.96

Q – 100-P

C – Absolute accuracy

Using the above formula sample size comes as 99 which is rounded off to 100

METHODS

This prospective non randomized study includes 100 patients admitted in the Department of General Surgery, Government Royapettah Hospital during the period of March 2018 to August 2018 with clinical suspicion of acute appendicitis and underwent open appendicectomy

- After approval by local bioethics committees, informed consent was obtained
- All cases had undergone thorough history and detailed clinical examination at the time of admission as part of routine management.
- Total and differential leucocyte count was measured using a autoanalyser
- As USG is technician dependent, only those patient who underwent abdominal USG by Consultant Radiologist were included in the study to exclude observer bias. He is blinded to the results of physical examination and blood report of the patients.
- Well established ultrasonographic criteria were applied to discriminate an acutely inflamed appendix from a normal one. Those with radiologist's opinion of findings suggestive of acute appendicitis, based on these criteria were taken as USG positive

Sonographic Criterias for Appendicitis

- Noncompressible appendix of size > 6 mm AP diameter,

  Hyperechoic thickened appendix wall > 2 mm—target sign.

- Prescence of Appendicolith.

- Interruption of submucosal continuity.

- Periappendicular fluid.

- Both Modified Alvarado Score and Zanakis score are done for all the patients at the time of admission and prior to surgery
- Even the patients with scores below the cutoff values were subjected to surgery based on clinical assessment and judgment.
- Patients were either subjected to emergency laparotomy at the time of admission or after few hours of conservative management. Emergency appendicectomy was done by open method under spinal or general anesthesia in all cases

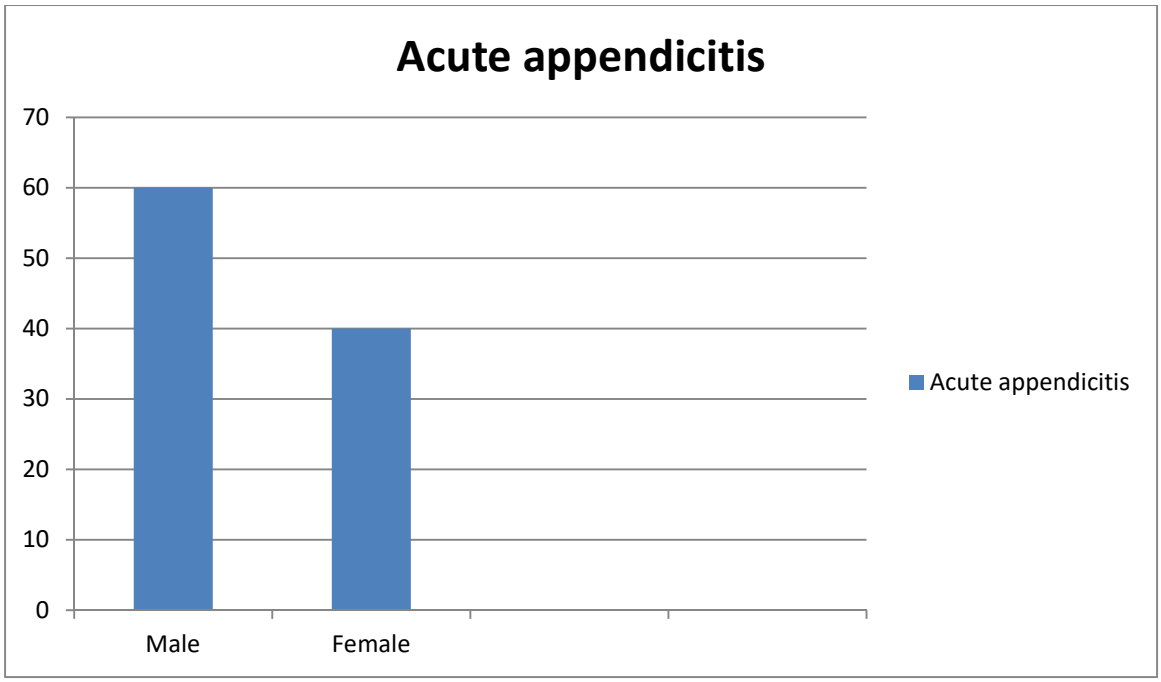
- Final diagnosis to be confirmed by Histopathological Examination of the specimen by the pathologist.
- Data was analyzed to compare the efficacy of both scoring systems in diagnosing Acute appendicitis
- The observations were analyzed using descriptive statistical methods and scores compared applying “Z” test and computing confidence interval and p value.

STATISTICAL ANALYSIS

STATISTICAL ANALYSIS

SEX

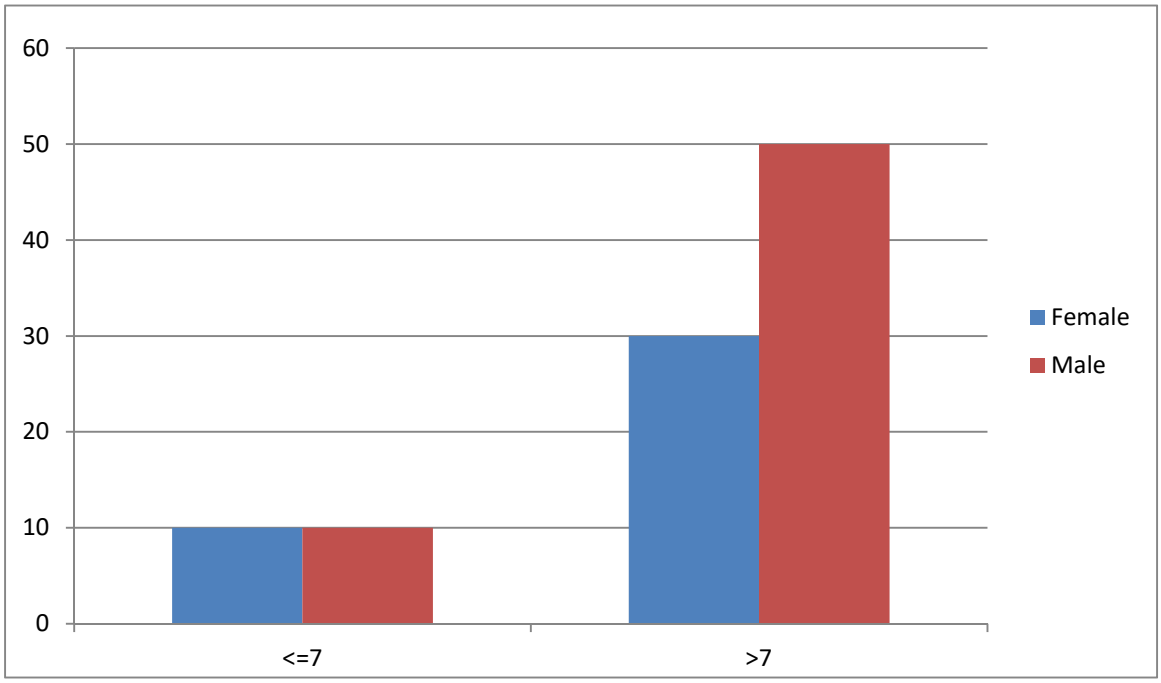
	No of cases
Female	40
Male	60
Total	100



There were more number of male cases compared t females, probably because females with abdomen pain present to hospitals with gynecology department

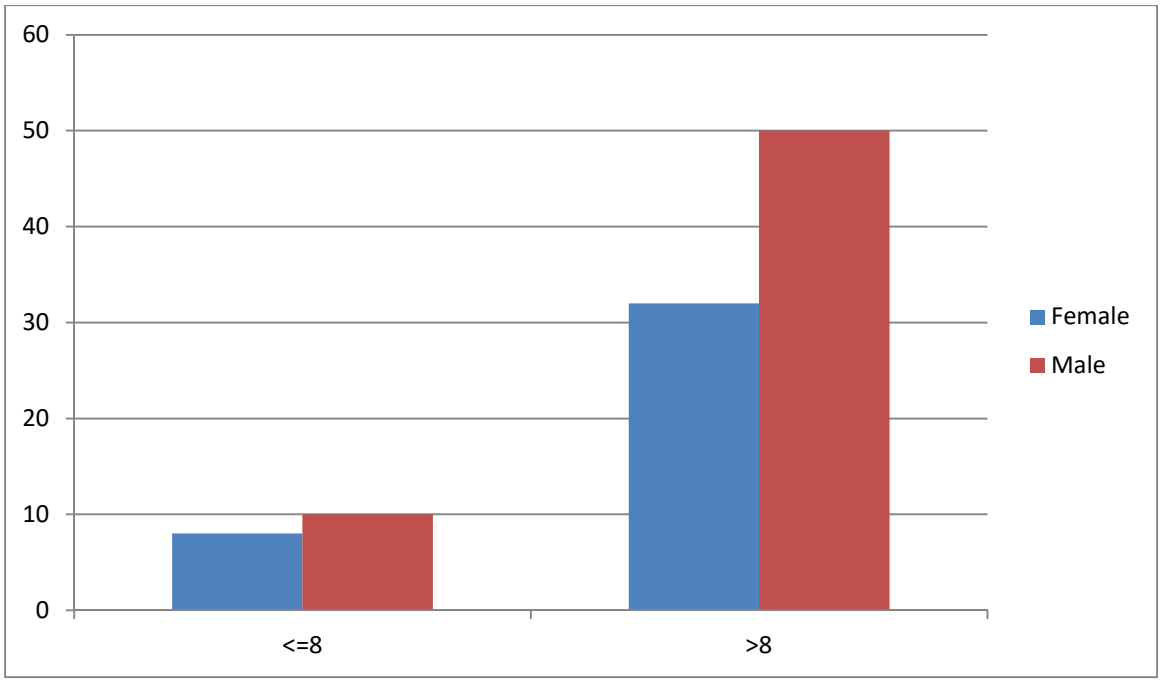
ALVARDO SCORE

	SEX		Total
	F	M	
Less than 7	10	10	20
More than 7	30	50	80
Total	40	60	100



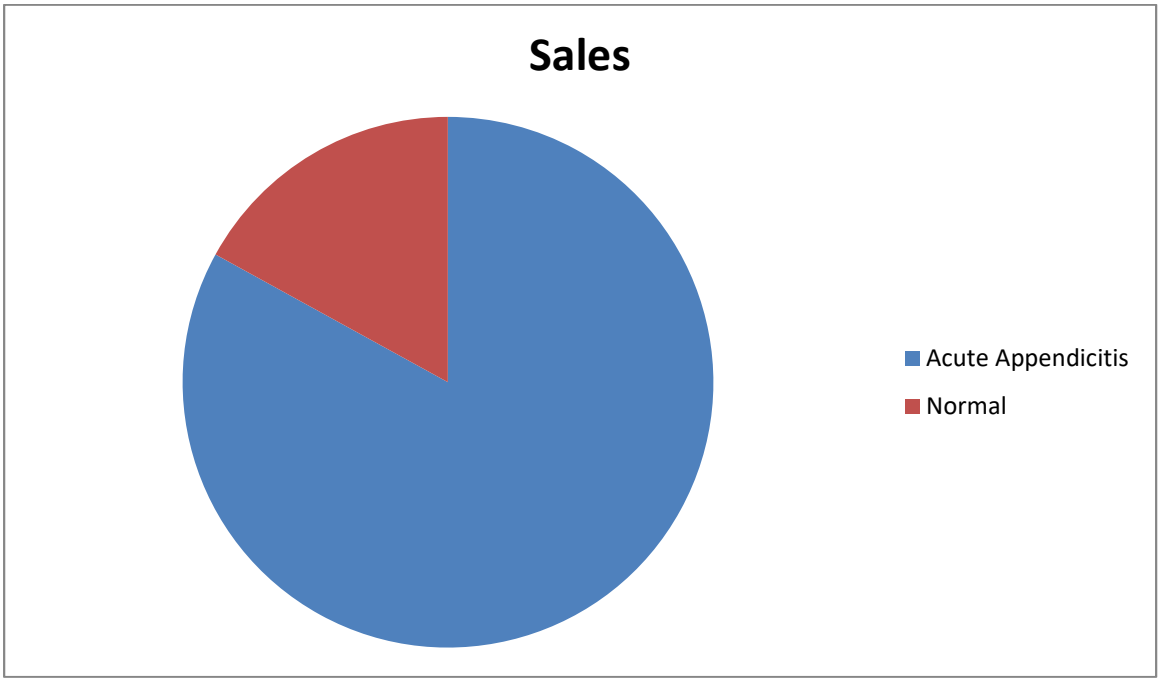
TZANAKIS SCORE

	SEX		Total
	F	M	
Less than 8	8	10	18
More than 8	32	50	82
Total	40	60	100



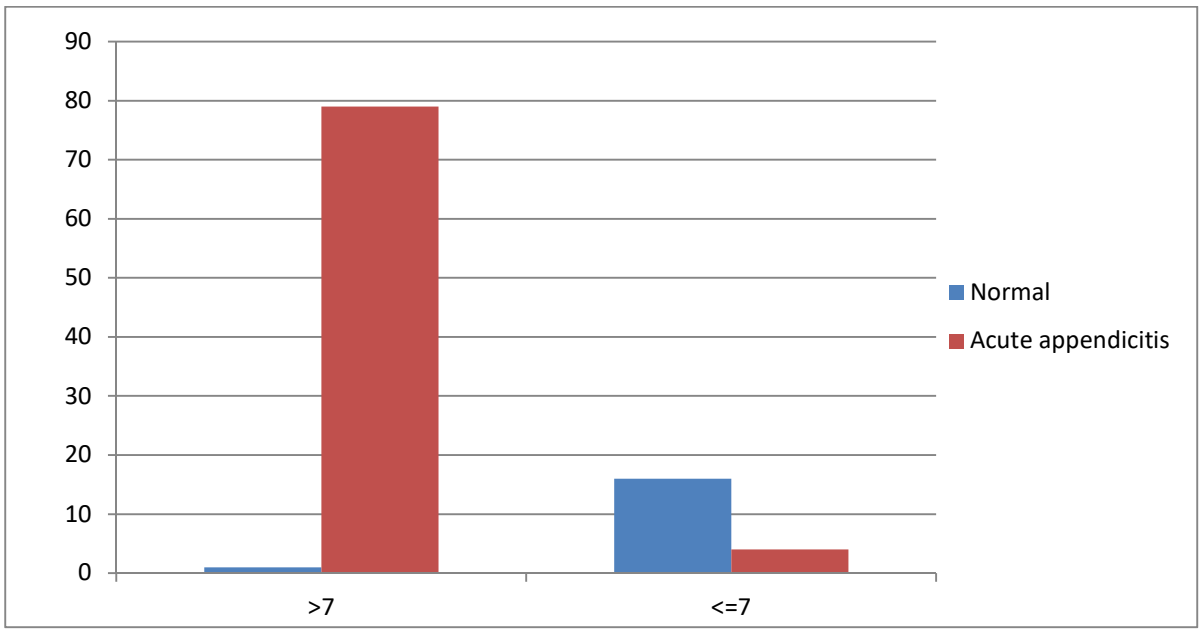
HISTOPATHOLOGICAL ANALYSIS

	No of cases
AA	83
N	17
Total	100



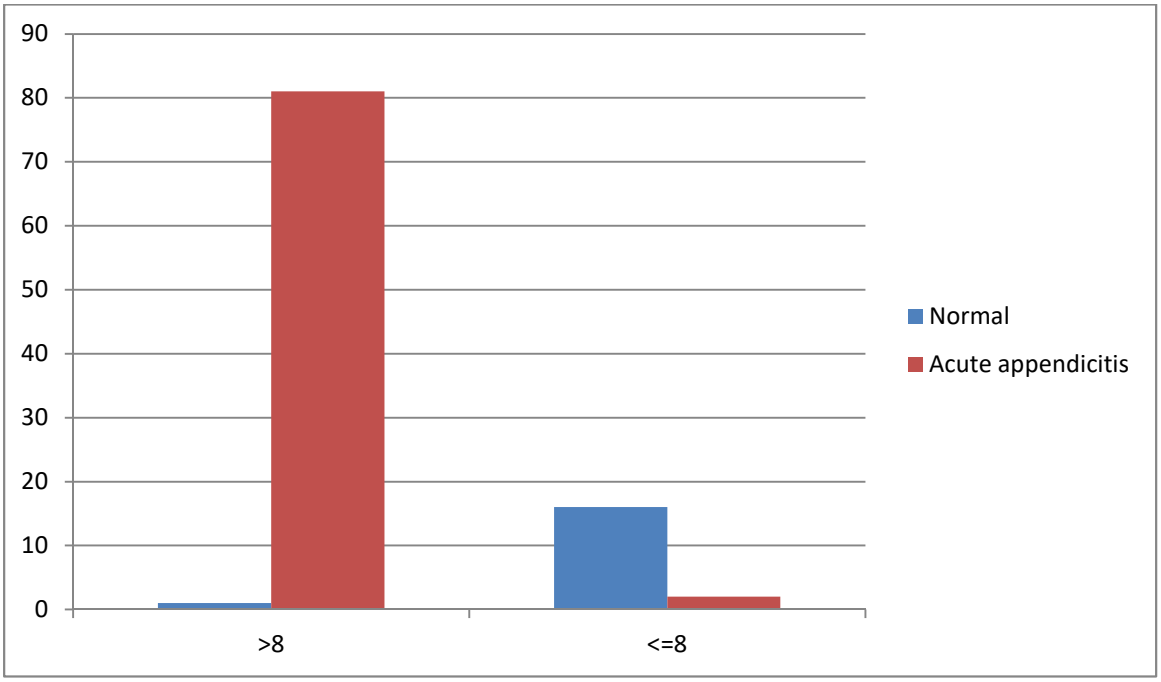
ALVARDO SCORE POST OP
CORRELATION WITH HPE REPORT

	HPEREPORT		Total
	N	AA	
More than 7	1	79	80
Less than 7	16	4	20
Total	17	83	100



TZANAKIS SCORE – POST OP
CORRELATION WITH HPE REPORT

	HPEREPORT		Total
	N	AA	
More than 8	1	81	82
Less than 8	16	2	18
	17	83	100



DESCRIPTIVE STATISTICS

	N	Minimum	Maximum	Mean	Std. Deviation
AGE	100	13.0	47.0	22.930	6.8656
ALVARADO	100	5.0	9.0	7.480	1.2017
TZANAKIS	100	5.0	15.0	11.510	3.0067

TZANAKIS, ALVARDO SCORE COMPARISON

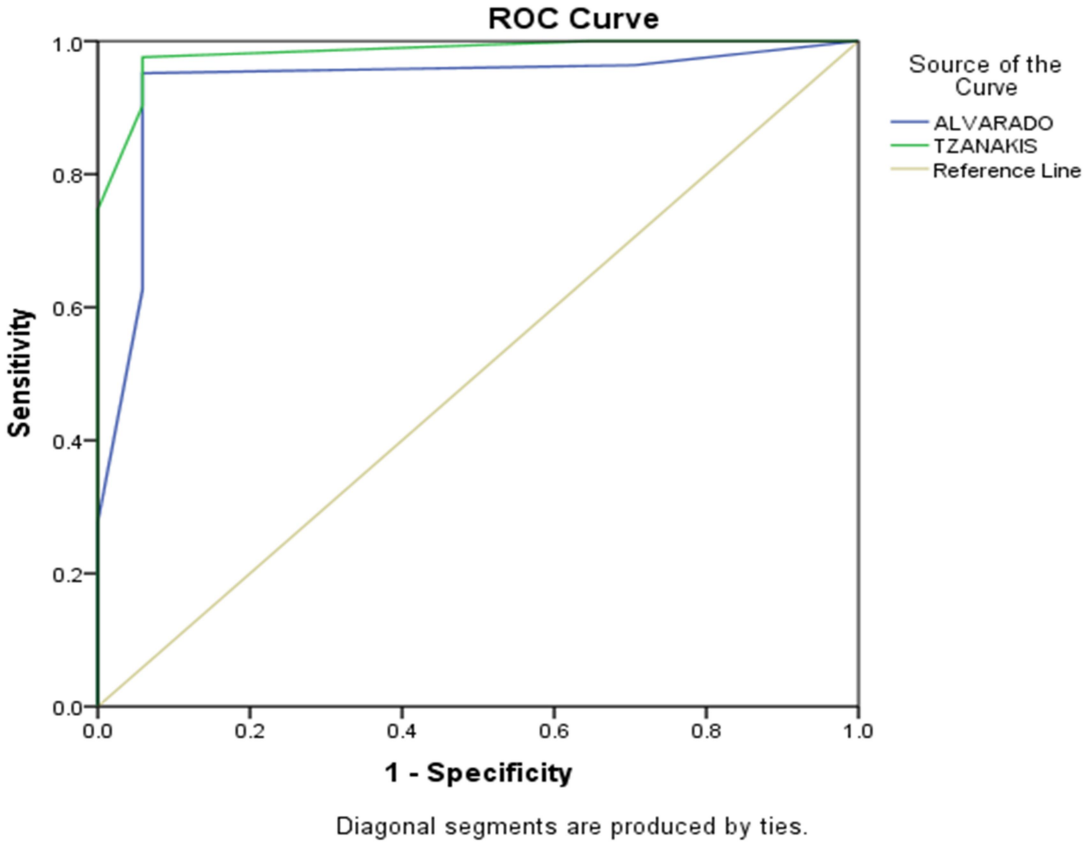
		Alvardo_		Total
		More than 7	Less than 7	
Tzanakis	More than 8	77	5	82
	Less than 8	3	15	18
Total		80	20	100

ALVARADO SCORE

Estimated Value	95% Confidence Interval		
		Lower Limit	Upper Limit
Prevalence	0.83	0.738913	0.895066
Sensitivity	0.951807	0.874517	0.984449
Specificity	0.941176	0.692383	0.996922
For any particular test result, the probability that it will be:			
Positive	0.8	0.705677	0.870752
Negative	0.2	0.129248	0.294323
For any particular positive test result, the probability that it is:			
True Positive	0.9875	0.922742	0.999347
False Positive	0.0125	0.000653	0.077258
For any particular negative test result, the probability that it is:			
True Negative	0.8	0.557314	0.933894
False Negative	0.2	0.066106	0.442686

TZANAKIS SCORE

Estimated Value	95% Confidence Interval		
		Lower Limit	Upper Limit
Prevalence	0.83	0.738913	0.895066
Sensitivity	0.975904	0.90757	0.995815
Specificity	0.941176	0.692383	0.996922
For any particular test result, the probability that it will be:			
Positive	0.82	0.72776	0.887041
Negative	0.18	0.112959	0.27224
For any particular positive test result, the probability that it is:			
True Positive	0.987805	0.924537	0.999363
False Positive	0.012195	0.000637	0.075463
For any particular negative test result, the probability that it is:			
True Negative	0.888889	0.639269	0.980517
False Negative	0.111111	0.019483	0.360731



Area Under the Curve

Test Result Variable(s)	Area	Std. Error[a]	Asymptotic Sig.[b]	Asymptotic 95% Confidence Interval	
				Lower Bound	Upper Bound
ALVARADO	.935	.035	.000	.866	1.000
TZANAKIS	.983	.012	.000	.958	1.000

The test result variable(s): ALVARADO, TZANAKIS has at least one tie between the positive actual state group and the negative actual state group

a. Under the nonparametric assumption

b. Null hypothesis: true area = 0.5

ANALYSIS OF THE STUDY

- The most common position of appendix intraoperatively was retrocaecal
- There was a slight male preponderance with 60 patients being males and 40 patients being females (Male : Female = 3:2)
- The mean age of patients was 22.93 years with a standard deviation of 6.86 years
- 83% of patients has histologicaly proven appendicitis
- Overall negative appendicectomy rate was 17%
- The sensitivity & specificity of Modified Alvarado Score was 95.81% & 94.11% with a positive predictive value of 98.75% & negative predictive value of 80%. The positive likely hood ratio was 16.18 and negative likelihood ratio was 0.05.
- The sensitivity and specificity of Tzanakis score was 97.59% and 94.11% respectively with a positive predictive value of 98.78% and negative predictive value of 88.88%. The positive likely hood ratio was 16.59 and negative likelihood ratio was 0.03
- The diagnostic accuracy of Alvarado score was 95% and that of Tzanakis score was 97%.
- Thus our study shows that Tzanakis scoring has improved sensitivity and Diagnostic accuracy, though specificity remains the same

	ALVARADO >7	TZANAKIS >8	p-value
Sensitivity	95.18% (87.45- 98.44)	97.59%(90.75-99.58)	<0.001
Specificity	94.11%(69.23-99.62)	94.11%(69.23-99.69)	
Positive predictive value	98.75%(92.27 – 99.93)	98.78%(92.45-99.93)	
Negative predictive value	80.00%(55.73-93.38)	88.88%(63.92-98.05)	<0.001
Diagnostic accuracy	95%(88.72-98.36)	97(91.48-99.38)	
COMPARISON BETWEEN ALVARADO AND TZANAKIS SCORING SYSTEMS			

DISCUSSION

DISCUSSION

- AA is the most common surgical emergency. Though it is commonly a clinical diagnosis, is always a difficult task for a surgeon to accurately exclude other causes that may mimic appendicitis, leading to a high negative appendicectomy rate.

- Despite the advances in the diagnostic field, the diagnosis of acute appendicitis remains an enigma for the attendant surgeon. Many investigative modalities like CT and MRI are not easily available at many centres and are costly. With this background, many eminent surgeons and physicians have been adopting different scoring systems in order to decrease negative appendectomy rates. Many diagnostic scores have been advocated, but most are complex and difficult to implement in a clinical situation.

- Tzanakis et al have reported that its scoring system had sensitivity and specificity of 95.4% and 97.4% respectively. This is comparable to our study with sensitivity and specificity of 97.59 & 94.11 respectively.

- Sigdel GS et al reported sensitivity and specificity of 91.48% and 66.66% respectively. They maintained that low specificity was due to low sensitivity rate of USG (63.82%) due to individual bias. Ultrasound examination is operator dependent and has variable levels of sensitivity and specificity (75-90% and 86-100%).

- Sigdel GS et al also observed positive and negative predictive values of 97.27% and 33.33% respectively while the same were 98.78% & 88.88%respectively in our study. The high negative predictive value is again due to the reduction of observer bias of radiology in our study.

- Harsha BK et al reported a sensitivity of 98.8% and a specificity of 93.3% for Modified Alvarado score.19 They further reported PPV of 89.3% and NPV of 83.3% while the same were found to be 98.75% and 80% respectively. The higher PPV in our study is due to larger sample size as against 45 in the study done by Harsha BK et al. Sensitivity (95%) of Modified Alvarado score in our study is little lower than that reported by Harsha BK et al but the difference is not significant.

- A negative appendectomy rate of 20-40% has been reported in the literature and many surgeons advocate early surgical intervention for the treatment of acute appendicitis to avoid perforation, accepting a negative appendectomy rate of about 15-20%. Overall negative appendectomy rate in our study was 17% which is comparable to various studies reported in the literature.

- Negative appendectomy rate among females was higher than in males .The discrepancy is due to high chances of alternate diagnosis in females of reproductive age group.

CONCLUSION

CONCLUSION

Acute appendicitis is a common surgical emergency. Good clinical judgment aided by investigation scoring system can help to reduce the negative appendectomy rate. Ultrasound scan has now become easily available, even in developing countries and it can immensely aid the surgeon in diagnosis.

This study shows that Tzanakis scoring system can be used as an effective modality in the establishment of accuracy in diagnosis of acute appendicitis. There is increased sensitivity and diagnostic accuracy in Tzanakis scoring when compared to modified Alvarado score

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MASTER CHART

S:NO	NAME	SEX	AGE	ALVARADO	TZANAKIS	HPE REPORT
1	RAMANATHAN	M	21	8	10	AA
2	AROKYADAS	M	17	7	12	AA
3	SHANMUGAM	M	32	7	10	AA
4	SARASWATHY	F	29	9	15	AA
5	CHITRA	F	22	8	**7**	AA
6	SUGUNA	F	38	7	13	AA
7	RAVI	M	30	8	10	AA
8	PARVATHY	F	17	5	7	N
9	GANESH	M	15	9	15	AA
10	RAMESH	M	19	7	13	AA
11	PERUMAL	M	26	6	6	N
12	SUGANYA	F	29	9	12	AA
13	PRIYA	F	28	9	10	AA
14	KANNIAMMAL	F	34	9	15	AA
15	RAJA	M	41	8	15	AA
16	VEERA	M	23	7	12	AA
17	PAVITRA	F	19	8	10	AA
18	RAJENDRAN	M	28	8	13	AA
19	KANNAYAN	M	22	8	12	AA
20	JANAKI	F	30	5	5	N
21	ROJA	F	19	6	7	N
22	BAKYAVATHY	F	27	9	15	AA
23	RANI	F	16	9	15	AA
24	LAKSHMANAN	M	19	9	12	AA
25	LOGANATHAN	M	22	8	10	AA
26	SIVAGAMI	F	18	7	13	AA
27	KANNAMAL	F	21	7	9	AA
28	JEYARAJ	M	20	5	6	N
29	VELAN	M	31	8	12	AA
30	JEYARAMAN	M	33	8	12	AA
31	SUNDARI	F	42	8	10	AA
32	MANIMOHZI	F	17	5	7	N
33	ANNAKILI	F	26	8	13	AA
34	CHANDRAN	M	21	8	12	AA
35	MANJULA	F	24	6	7	N
36	VENNILA	F	16	7	9	AA

37	SANKARI	F	17	**6**	8	AA
38	KULANDAISWAMY	M	28	9	12	AA
39	ARAFATH SALEEM	M	29	8	13	AA
40	PARVEEN	M	25	9	15	AA
42	MANIMEGALAI	F	14	6	6	N
43	ESHWARAN	M	19	9	15	AA
44	REKHA	F	22	**8**	7	N
45	SASIKALA	F	29	8	12	AA
46	ARUMUGAM	M	19	9	13	AA
47	ARULKUMAR	M	17	8	10	AA
48	PUSHPA	F	13	8	15	AA
49	SAIKUMAR	M	22	9	15	AA
50	SHANTHI	F	15	9	15	AA
51	FAIZAL	M	18	6	7	N
52	MOORTHY	M	27	8	13	AA
53	PUSHPARAJ	M	34	6	6	N
54	MANOJ	M	13	7	12	AA
55	SAVEETHA	F	17	9	15	AA
56	SAKTIVEL	M	27	5	7	N
57	SASIDARAN	M	17	8	13	AA
58	LALITHA	F	16	9	15	AA
59	MUKESH	M	19	9	15	AA
60	UMA	F	17	**5**	8	AA
61	GEETHA	F	25	6	**10**	N
62	KUMAR	M	14	7	12	AA
63	MANJUNATH	M	26	6	6	N
64	SATHYARAJ	M	14	9	15	AA
65	GOWRI	F	19	9	15	AA
66	SHANTHINI	F	31	9	15	AA
67	KANNAPAN	M	21	7	**7**	AA
68	RAJESH	M	19	8	15	AA
69	JEFREY	M	17	7	12	AA
70	SANTHOSH	M	17	7	13	AA
71	RAVIKUMAR	M	36	7	15	AA
72	PREETHI	F	24	8	12	AA
73	VIMAL	M	17	7	15	AA
74	NAVEEN	M	27	**5**	9	AA
75	BHAKYARAJ	M	23	7	12	AA
76	PRABAKARAN	M	19	7	15	AA
77	SWETHA	F	24	7	10	AA
78	SANGEETHA	F	23	8	10	AA
79	NATARAJ	M	26	9	15	AA
80	ARUNKUMAR	M	27	6	7	N
81	RAKESH	M	16	7	12	AA

82	SWATHI	F	24	8	15	AA
83	PRAKASH	M	13	7	12	AA
84	RAMOORTHY	M	18	7	13	AA
85	KALI	M	32	8	15	AA
86	ELUMALAI	M	24	9	15	AA
87	VIKRAM	M	18	8	13	AA
88	RAMANUJAM	M	27	6	7	N
89	VIJAY	M	19	7	12	AA
90	POORNIMA	F	18	7	10	AA
91	MOHANA	F	27	**5**	9	AA
92	MOHAMMAD	M	14	8	15	AA
93	DINESH	M	15	7	12	AA
94	DHAYALAN	M	19	9	12	AA
95	MAHALAKSHMI	F	28	8	13	AA
96	NIROSHA	F	19	8	15	AA
97	DANAPAUL	M	27	6	7	N
98	NIRMALKUMAR	M	31	7	10	AA
99	RAJKUMAR	M	24	7	10	AA
100	ASHOK	M	18	8	15	AA

PROFORMA

- NAME:
- I.P.no:
- AGE/SEX:
- OCCUPATION:
- ADDRESS:
- SOCIOECONAMIC STATUS:
- DATE AND TIME OF ADMISSION:
- DATE AND TIME OF SURGERY:
- ALVARADO SCORE:
- TZANAKIS SCORE:
- HISTOPATHOLOGICAL REPORT:

சுயஒப்புதல்படிவம்

ஆய்வுசெய்யப்படும்தலைப்பு'A STUDY COMPARING MODIFIED ALVARADO SCORE AND TZANAKI'S SCORE FOR DIAGNOSING ACUTE APPENDICITIS' , Department of General Surgery, GRH.

பங்குபெறுபவரின்பெயர் :

பங்குபெறுபவரின்வயது : பங்குபெறுபவரின்எண் :

மேலேகுறிப்பிட்டுள்ளமருத்துவஆய்வின்விவரங்கள்எனக்குவிளக்கப்பட்டது.
நான்இவ்வாய்வில்தன்னிச்சையாகபங்கேற்கிறேன்.
எந்தகாரணத்தினாலோஎந்தசட்டசிக்கலுக்கும்உட்படாமல்நான் இவ்வாய்வில்இருந்துவிலகிக்கொள்ளல்லாம்என்றும்அறிந்து கொண்டேன்.

இந்தஆய்வுசம்பந்தமாகவோ,
இதைசார்ந்துமேலும்ஆய்வுமேற்கொள்ளும்போதும்இந்தஆய்வில்பங்குபெறும்மருத்துவர்என்னுடையமருத்துவஅறிக்கைகளை பார்ப்பதற்குஎன்அனுமதிதேவையில்லைஎனஅறிந்துகொள்கிறேன். இந்தஆய்வின்மூலம்கிடைக்கும்தகவலையோ, முடிவையோபயன்படுத்திக்கொள்ளமறுக்கமாட்டேன்.

இந்தஆய்வில்பங்குகொள்ளஒப்புக்கொள்கிறேன்.
இந்தஆய்வைமேற்கொள்ளும்மருத்துவஅணிக்குஉண்மையுடன் இருப்பேன்என்றும்உறுதியளிக்கிறேன்.

பங்கேற்பவரின்கையொப்பம்

இடம் :

தேதி :

பங்கேற்பவரிஆய்வாளரின்கையொப்பம்

ஆய்வாளரின்கையொப்பம்